

Amendments to the Claims:

1-42 (Canceled)

43. (Currently Amended) An integrated circuit design library for providing design elements for analog and mixed signal circuits, the library comprising:

a set of selectable transmission line topologies selectable as design elements for critical interconnect lines of an integrated circuit being designed, wherein the integrated circuit may be modeled using said critical interconnect lines before the physical layout of the integrated circuit is determined, said critical interconnect lines defined by a set of geometry parameters and capable of carrying analog and mixed signals, which topologies comprise return paths therein; and

a set of parameterized, equivalent RLC ladder networks, one per topology.

44. (Previously Presented) The library according to claim 43 and also comprising means for performing both frequency and time domain analysis for each transmission line placed into an integrated circuit design.

45. (Previously Presented) The library according to claim 43 and wherein at least an inductance parameter of each said transmission line topology is a function of frequency

46. (Canceled)

47. (Currently Amended) The library according to claim 45 and wherein the frequency range of interest ranges from DC to a transistor cut-off frequency.

48. (Canceled)

49. (New) The library according to claim 43, wherein said equivalent RLC ladder networks are constructed by using the set of geometry parameters and a reduced RLC network for the selected topology, such that the equivalent RLC networks may be used by a circuit-level simulator to model said critical interconnect lines,

wherein actual RLC values for said reduced RLC network are calculated by using calculated low frequency RLC values and calculated high frequency RLC values, such that said

reduced RLC network correctly describes the transmission line topology behavior across a frequency range of interest,

wherein the low frequency RLC values are calculated per unit length using a model complying with electrostatic and magnetostatic principles for a geometry parameter range and the high frequency RLC values are calculated per unit length using a quasi-TEM approximation from the capacitance data to calculate a high frequency limit transverse electromagnetic inductance matrix.

50. (New) A method for modeling a transmission line topology selectable as a design element for a critical interconnect line of an integrated circuit being designed, wherein the integrated circuit may be modeled using said critical interconnect lines before the physical layout of the integrated circuit is determined, said critical interconnect line being defined by a set of geometry parameters and capable of carrying analog and mixed signals, wherein said transmission line topology comprises signal return paths therein, the method comprising:

calculating low frequency RLC values per unit length, wherein the low frequency values are calculated using a model complying with electrostatic and magnetostatic principles for a geometry parameter range;

calculating high frequency RLC values per unit length, wherein a high frequency limit transverse electromagnetic inductance matrix may be calculated from the capacitance using a quasi-TEM approximation; and

calculating actual RLC values for a reduced RLC network by using the calculated low frequency RLC values and the calculated high frequency RLC values, wherein the reduced RLC network correctly describes the behavior of said transmission line topology across a frequency range of interest; and

constructing an equivalent RLC network for said transmission line topology using the set of geometry parameters and the reduced RLC network, such that the equivalent RLC network may be used by a circuit-level simulator to model said critical interconnect lines.

51. (New) A computer program product comprising a computer usable medium including computer usable program code for modeling a transmission line topology selectable as a design element for a critical interconnect line of an integrated circuit being designed, wherein the integrated circuit may be modeled using said critical interconnect lines before the physical layout of the integrated circuit is determined, said critical interconnect line being defined by a set of geometry parameters and capable of carrying analog and mixed signals, wherein said transmission line topology comprises signal return paths therein, said computer program product including:

computer usable program code for calculating low frequency RLC values per unit length, wherein the low frequency values are calculated using a model complying with electrostatic and magnetostatic principles for a geometry parameter range;

computer usable program code for calculating high frequency RLC values per unit length, wherein a high frequency limit transverse electromagnetic inductance matrix may be calculated from the capacitance using a quasi-TEM approximation;

computer usable program code for calculating actual RLC values for a reduced RLC network by using the calculated low frequency RLC values and the calculated high frequency RLC values, wherein the reduced RLC network correctly describes the transmission line topology behavior across a frequency range of interest; and

computer usable program code for constructing an equivalent RLC network for said transmission line topology using the set of geometry parameters and the reduced RLC network, such that the equivalent RLC network may be used by a circuit-level simulator to model said critical interconnect lines.